

## CHAPTER 4.0 Cold Weather Test



The story of the “Cold Nose Boys,” as they are known at Ladd Field, is a story of...hard plugging under severe arctic conditions; a story of general success, with occasional touches of tragedy. It’s the story of the struggle to destroy the cold weather Gremlins that were ever present to harass both men and planes. In that struggle, the Cold Weather Testing Detachment has played a leading and honorable role.

-North Star Magazine, ATC, 1944  
AAF photo

### History of the Testing Program

The cold weather test program at Ladd Field began as a promising but small operation in 1940, hampered by primitive facilities and logistical problems. A few years later it had grown into a sophisticated operational testing program. By the final winter of the war, over 700 military and civilian personnel were involved in testing 22 different types of aircraft and associated equipment. At its height, with a cadre of experienced flight officers, and wide variety of aircraft and technical support personnel, the Cold Weather Test Detachment was said to be one of most highly paid units of its size in the entire armed forces.<sup>30</sup> Even as Ladd Field itself changed hands among various commands throughout the war, cold weather testing remained a major activity.

Ladd’s testing program had powerful backing. The Chief of the Army Air Corps, Gen. Henry H. “Hap” Arnold, was one of the most powerful voices advocating for operational cold weather testing in Alaska. Arnold was a strong proponent of aeronautical research and development as part of his overall vision for coordinated American airpower. He also understood that a successful air force was actually a complex system of operations, logistics, procurement, and ground support. All of these elements had to work together,

in any climactic conditions that wartime demanded. For that reason, laboratory testing of aircraft by itself was not sufficient to overcome the various engineering challenges that would arise in field testing and actual operations. Before Ladd Field was built, cold weather testing had been undertaken in laboratory conditions as part of the aircraft design and engineering process, but field testing under severe cold conditions had been sporadic.<sup>31</sup>

Arnold advocated for the funding and construction of Ladd Field and his influence ensured the survival of cold weather testing during the height of the war when scarce resources were being funneled directly to combat commands. As evidence of its importance, at various times Ladd Field was exempt from the tactical chain of command in Alaska, reporting instead to Gen. Arnold’s office

<sup>30</sup> Personnel figures as of November 1944: 84 officers, 533 enlisted. *Monthly Historical Report, 1466<sup>th</sup> AAF Base Unit, November 1944*. Microfilm AO177, Elmendorf Air Force Base History Office. Civilian technical representatives estimated at approximately 100-120, per housing capacity given in *Summary of Field Progress Reports*, Corps of Engineers Seattle District, June 1945, Ladd Field entry. University of Alaska Anchorage Archives, Alaskan Air Command Files collection, series III, f 23. Re unit pay, *History, Cold Weather Detachment, Ladd Field 1 Feb 42 – 12 Jan 45*. Microfilm A0057A, Elmendorf Air Force Base History Office, 45.

<sup>31</sup> Re Gen. Arnold, Maj. Dik Daso, “Origins of Airpower: Hap Arnold’s Command Years and Aviation Technology, 1936-1945. Electronic document, <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj97/fal97/daso.html>, 2. Originally published in *Aerospace Power Journal*, Fall 1997. Re labs and field testing, “Cold Weather Detachment Historical Data,” Elmendorf History Office, Cold Weather Operations at Ladd Field, 2.



**Figure 12.** Hangar One under construction, ca winter 1940-41. Note what appear to be temporary maintenance shelters in foreground. AAF photo, courtesy Eielson AFB and Steve Dennis.

in Washington, DC. The testing programs at Ladd were also coordinated with the aeronautical research efforts of the Materiel Division, later the Materiel Command, at Wright Field near Dayton, Ohio. In the later years of the war, when Ladd was no longer an exempted station, the cold weather testing program reported to the Proving Ground Command.

Ladd Field, the Cold Weather Experiment Station, began operations in September 1940. The testing season began under primitive conditions. The first test airplane, an O-38, arrived at Ladd in a crate, shipped by water and rail. Two B-17s and two P-37s were sent shortly afterward. There was only a small complement of personnel, and permanent facilities were still incomplete because operations had commenced a year ahead of schedule. Because of the lack of facilities, Gaffney reported, “All tests and experiments were in every sense strictly an out-of-doors operation regardless of the temperature.”<sup>32</sup>

That first winter, Gaffney’s personnel made a series of observations on Alaskan flying weather and conditions, airplane maintenance and operation, motor transport, clothing, communications, medical issues, and photographic and survival equipment. Aircraft maintenance and operation were the primary concern, and, as a result of this first season’s work, guidelines were developed for cold weather operations. Procedures included parking the aircraft outdoors, covering wings and tails to prevent frost build-up, diluting engine oil briefly, using oil immersion heaters and preheating engines before starting. Gaffney himself took on pilot duties when he could. His exploits were featured in the national press when he helped to field test a pilot’s prototype electric under-suit.<sup>33</sup>

#### WWII Aircraft Types

O	Observation
P	Pursuit
B	Bomber
T	Trainer
A	Attack

Only five aircraft were available at this remote location that first winter of testing, and not all of these remained in service the entire season. One of the P-37s was damaged beyond repair almost immediately, and the other one sat idle for two months waiting for an engine replacement. One of the B-17s was lost in a February crash that took the lives of the eight men on board. They had been enroute to Wright Field via Sacramento, carrying records and reports of the station. The loss of this crew weighed heavily on the small contingent at Ladd who were weathering the first winter of operations. Roads on Ladd Field were later named for the some of these crew members: Freeman, Ketcham, Whidden, Trainer, Gilreath, Davies, and Applegate.<sup>34</sup>

<sup>32</sup> “Report of Operations...,” 1.

<sup>33</sup> HCWTD, 16.

<sup>34</sup> The full crew consisted of Capt. Richard S. Freeman, Lt. Edward W. Ketcham, T/Sgt. K. H. Gilreath, S/Sgt. Everett Crabb, Sgt. Joseph F. Davies, Sgt. Elmer S. Trainer, Sgt. Frank Whidden, and Pvt. Charles Applegate. The accident occurred on Feb. 6, 1941, outside of Lovelock, Nevada. HCWTD, 17-18.



Infantry and artillery units were also performing cold weather tests during the first season at Ladd Field. 2<sup>nd</sup> Lieutenant (now ret Col.) Richard Dennison of the 4<sup>th</sup> Infantry, Company L, remembered that his unit assisted with cold weather test duties. “Whenever we could we went to the field and tested cold weather gear – from clothing to sleeping, to cooking.” In January, the infantry made a snowshoe expedition up the Chena River. That assignment was intended as an orientation to cold weather travel and doubled as a test exercise. Each squad wore different types of fur garments including mukluks, parkas, mittens and headgear. A local newspaper described the event, referring to the soldiers affectionately as “sourdoughboys.” An artillery detachment from Fort Richardson also came to Ladd on a temporary assignment to test fire weapons.<sup>35</sup>

As the first season came to a close, plans were drawn up for the next year’s operation. The idea was that the Army Air Corps would send Ladd Field two fully winterized test aircraft of every type in its inventory and that these airplanes would arrive early in the testing season to maximize their usefulness. This remained an unrealized dream for several more years as competing demands for aircraft took priority.

As the second testing season approached in September 1941, Gaffney was still making do with limited resources. At that time, all the new Alaskan military bases were in a similar situation: constructing facilities, acquiring personnel and supplies, and developing functional organizations. At Ladd, the total strength of all units on the post had grown to 520 men. This figure included Company L of the 4<sup>th</sup> Infantry, which provided airfield defense, and the 206<sup>th</sup> Coast Artillery, Battery H, which manned antiaircraft artillery. These ground units outnumbered the undermanned Air Corps personnel by four to one. The Air Corps only had thirteen pilots at the station; the rest were crewmen, mechanics, and support personnel.<sup>36</sup> Gaffney’s frustration was palpable. He needed proper resources as well as the commitment of all the contributing agencies and this was slow in coming.



**Figure 13.** Ladd officers posing with Commanding General, Alaska Defense Command, March 1941. Left to right, Lt. Marvin Walseth, adjutant; Brig. Gen. Simon Buckner, Commanding General, ADC; Maj. Hobart Murphy, 4<sup>th</sup> Infantry; Maj. Williams, Quartermaster; Capt. Neal, weather officer. Courtesy Steve Dennis.

Although Gen. Arnold, the Chief of the Air Corps, was committed to cold weather testing at Ladd, there were differences of opinion about Ladd Field at high command levels. One of the main questions was whether Ladd’s facilities should be under the command of the tactical forces of the Alaska Defense Command or remain in an “exempted” status. During the fall of 1941, an agreement had apparently been reached: Ladd would continue as an exempted station, but this would not remain settled for long. A second point of contention was within the Materiel Command and the related agencies responsible for research and development. A vigorous debate developed over how much emphasis the remote field testing program at Ladd should have and how much of the work should be done in the existing laboratory-based research programs at places like Wright Field.

<sup>35</sup> Richard F. Dennison, correspondence with author, August 2002. “U.S. Soldiers...” *Fairbanks Daily News-Miner*, 21 January 1941, 1. “Col Landreth Reviews Cold Weather Task,” *Fairbanks Daily News-Miner*, 20 February 1941, 3.

<sup>36</sup> Lt. Col. Gaffney to Lt. Col. Earl Hoag, Air Corps, War Department General Staff, 23 September 1941. Elmendorf AFB History Office, Cold Weather Operations at Ladd Field.

Despite the limitations of personnel, late arriving aircraft, and ongoing construction at the field, Gaffney and his staff pressed forward with another winter's testing. War news from Europe and Asia overshadowed daily life. Then on December 7<sup>th</sup>, 1941, Japan attacked Pearl Harbor, launching the United States into the war. For a time, cold weather testing was disrupted as Alaskan military commanders adjusted to the new and dangerous circumstances. Aircraft were diverted to defensive needs. By early February, reorganizations were taking place at Ladd. For the first time, general base operations were officially divided from cold weather test functions, and a separate Cold Weather Test Detachment (CWTD) was activated. The new Base Detachment took over day-to-day operating functions.<sup>37</sup>

As the winter of 1941-42 came to a close, Ladd Field was still an exempted station dedicated to cold weather testing, but change was on the horizon. When the Japanese bombed Dutch Harbor and occupied the Aleutian islands of Attu and Kiska in June 1942, the Cold Weather Test Detachment was ordered to disband and participate in the defense of the region. Several of the CWTD pilots and crews were dispatched to the Aleutians as part of the 36<sup>th</sup> Heavy Bombardment Squadron, based out of Umnak Island. Most of the rest of the men were sent to join a rapid buildup of forces at the airfield and garrison at Nome where further attack was anticipated.

The men of Cold Weather Test, deployed in the early weeks of the Aleutian campaign, faced harsh combat conditions. During the four months of emergency deployment, Cold Weather Test officers and men earned combat decorations including the Distinguished Flying Cross, Legion of Merit, Purple Heart, and the Air Medal.<sup>38</sup> They sustained casualties and did their duty as part of the first group of responding forces. At Nome three men were killed and five were severely injured when an out-of-control B-18 bomber carrying several 300-pound demolition bombs slammed into an ammo dump near their camp. Others in the unit were able to respond and rescue the airplane's pilot and crew before explosions destroyed the camp. In the Aleutians, Cold Weather Test fliers flew patrol missions and bombing runs over Kiska Island.

During this period, three Ladd Field pilots and their crews were lost to enemy fire and combat-related airplane crashes. Maj. Jack S. Marks was killed in July when the bomber he was flying was shot down. Maj. Marvin Walseth and Lt. Norman Nysteen were lost to crashes during combat missions in the Aleutians' dangerous flying weather. Their loss was felt in Fairbanks where the young officers and their families had developed friendships and ties in the small town. Maj. Marks had recently filed on a homestead adjacent to Ladd Field. Maj. Walseth and his wife had been expecting their first child, but after Pearl Harbor, Mrs. Walseth had been ordered to leave Alaska with other military dependents. Just before deploying to the Aleutians, Maj. Walseth received word of the distant birth of his child, whom he would never see. Later in the war, other fliers associated with Ladd would be

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<sup>37</sup> *Official History of Ladd Field*, microfilm AO177, Elmendorf AFB History Office, 60. Authorized strength of CWTD was 38 officers and 180 enlisted men. The Base detachment strength was 6 officers and 70 enlisted men. A sub-depot took over engineering and supply functions a month later. OHLF 62.

<sup>38</sup> Marks Rd, Nysteen Rd, and the former Walseth Rd (now Gaffney Road) were named after these officers. Marks Field in Nome was also named in honor of Maj. Jack S. Marks.

lost in other tragedies of accidents and weather, leaving behind friends and loved ones in the Fairbanks area as well as in their hometowns.

By the end of that summer, however, Gen. Arnold saw to it that the Cold Weather Test Detachment was reactivated at Ladd. With the onset of war, Arnold continued his strong advocacy of aeronautical research and development. Pragmatically, he focused on research that could rapidly improve existing aircraft currently in production.<sup>39</sup> The testing program at Ladd was to be part of this overall effort.

Cold weather testing's wartime priority had now been permanently secured. In September the Cold Weather Test personnel returned to Ladd and Gaffney resumed command after a five-month absence on another assignment. Gaffney was determined to build the detachment into an effective operational testing unit that could work in coordination with multiple military research agencies and civilian manufacturers. Ensuring that equipment arrived on time and fully prepared for testing proved challenging. Logistical issues were not solved during the '42-43 season, but the action plan for the final two years of the war was laid out.

The re-established CWTD would focus on testing the winterization procedures and Arctic operations for all military aircraft and associated equipment.<sup>40</sup> Its staff would consult directly with civilian technical representatives from various manufacturers on a daily basis. Some in the research divisions objected to this arrangement, believing it introduced bias into the test results. Gaffney and his supporters insisted that it led to more efficient problem-solving, better awareness

of Arctic operating difficulties, and faster turn-arounds into production. "Too much emphasis cannot be laid on this matter," Gaffney stated, "and so far as this Headquarters is concerned every effort will be exerted to require closest cooperation and contact between commercial representatives and Army Air Force personnel."<sup>41</sup>

In 1942-43, twenty-three tech reps came to Ladd from twenty-one companies. Major aircraft manufacturers of the day were represented, including Bell, Boeing, Consolidated, Curtiss-Wright, Lockheed, North American, and Republic. Other companies included engine and component manufacturers such as Allison, Bendix, and Pratt & Whitney. Other equipment makers were also represented: Hamilton-Standard (propellers),

"[O]ur civilian support was terrific, because in Cold Weather Test we had...civilian tech reps here every winter and there was one from each major manufacturer of the United States, whether it was rubber, aircraft engines, tires, clothing, whatever it was, they were the top level engineers of their companies and they all lived in the Arctic Hotel...in Fairbanks. You could go down there anytime at night if you wanted to and you could learn, you could go to school, and you could learn about anything you wanted to learn just by who you visited with."

-Randy Acord, test pilot

<sup>39</sup> Daso, 4, 10.

<sup>40</sup> Specifically, CWTD was directed to "(1) To test new operation procedures and the complete winterization of all types of Army Air Forces equipment for Arctic use; (2) To secure adequate data for actual Arctic operation to verify or amend existing Tech Orders and bulletins on winterization; (3) To provide data to aircraft manufacturers as necessary to accomplish modifications and changes in design; (4) To test and suggest improvements on all equipment required by the Army Air Forces for Arctic operation." *Cold Weather Detachment Historical Data*, nd, Elmendorf AFB History Office, Cold Weather Operations at Ladd Field file.

<sup>41</sup> RCWTD, 442.



Herman-Nelson (ground heaters), General Electric (electric heaters), and General Motors (trucks). They became an essential part of the cold weather test program, working together with the Air Corps pilots to solve engineering problems and communicate information back to the factory production lines. Quarters were available for these representatives at the Arctic Hotel in Fairbanks.

Ladd's Cold Weather Test Detachment also expanded from the small scale of the previous two years to include 50 officers. They were test pilots, bombardiers, engineers, weather, photographic and support officers. In addition to the Ladd Field detachment, men from Wright Field were on site. They included researchers from eight laboratories at Wright Field: aero-medical research, aircraft, armament, equipment, materials, photographic, power plant, and propeller laboratories. The Signal Corps, Quartermaster Corps, and Air Service Command also contributed personnel.

The detachment requested that two of every aircraft in the inventory be winterized and sent to Ladd Field by the beginning of the cold weather season in early October. With the demands on wartime production, deliveries were delayed. Some airplanes arrived at Ladd so near the end of the winter that they missed the cold weather. Much to Gaffney's irritation, some did not arrive at all before he submitted the station's final reports in April 1943.

In his summary of that season's work, Gaffney confirmed that the basic winterization processes that had been developed in the previous two years of testing were sound. Significant problems still remained with aircraft components that failed or performed poorly in extreme cold, and these failures could compromise wartime missions. The Germans had experienced such failures in their winter campaign against the Soviet Union. Gaffney exhorted that the cold weather problems "which completely stopped the German offensive against the Russians in the past two winters must not be permitted to stop operation of Army Air Force aircraft."<sup>42</sup> He recommended that the AAF strive to be able to operate all aircraft at temperatures as low as 65 degrees F below zero and warned that the experience of the past winter had shown that the AAF had no combat or cargo aircraft that could reliably meet a threshold of even 25 below.

This transitional test season clearly pointed out the problems that the engineers would need to solve and provided first-hand experience to the manufacturer's reps and the Wright Field staff who had taken part. Civilian tech reps and Wright Field personnel had finally seen the difficulties that ground crews and flight crews experienced while working with aircraft at temperatures of thirty and forty below zero, had experienced the short winter days, and had witnessed the difficulties that supply problems and inexperienced personnel posed for the reality of Arctic air operations. The CWTD and the Wright Field staff forwarded over 150 technical reports to their headquarters. Their recommendations incorporated new information gathered from the winter's wartime missions in the Aleutians and on the Lend-Lease delivery route. Taken together with the Air Transport Command's experiences that winter on the Northwest Staging Route and the 11<sup>th</sup> Air Force's cold weather combat flying in the Aleutians, the problems of cold weather operations were at last getting the attention they required.

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<sup>42</sup> RCWTD, 9.

During the last two winters of the war, CWTD continued to follow the research pattern that was set in the winter of '42-'43. The detachment conducted experiments in coordination with Wright Field, Eglin Field, and the manufacturers' civilian tech reps. Following Gen. Arnold's research priorities, they focused on making improvements to existing production aircraft and equipment. According to one of the project officers at that time, the detachment was able to meet its goal of having all aircraft in the inventory operational to a temperature threshold of forty below or better within that two-year period.<sup>43</sup>



**Figure 14.** CWTD Fighter section crew, ca. 1944. Courtesy Pioneer Air Museum/Randy Acord.



**Figure 15.** Fighters in front of the CWTD's T-Hangar. AAF photo.

To accomplish its testing goals, the detachment was divided into four flight sections with some smaller sections devoted to other cold weather issues. The main flights were: Fighter Section, Medium Bombardment, Heavy Bombardment, and Miscellaneous Aircraft. Other components included Auxiliary Test, Supply, Armament, Ordnance, Transportation, and Photographic. Nine technical shops supported the detachment's efforts: Bombsight, Parachute, Machine, Instrument, Electric, Sheet Metal, Radio, Radar, and Hydraulic.

During this period, Ladd Field itself had been transformed to accommodate ALSIB Lend-Lease with an additional runway, new hangars, and hundreds of temporary buildings. At this time, the CWTD was based out of the east half of Hangar One. A pair of Kodiak T-hangars and an adjoining cluster of ten Butler buildings had been constructed for the detachment's use east of Hangar One.<sup>44</sup> Six of the Butler warehouses are still extant. Randy Acord stated "that's where we did all of our testing on clothing, ground support equipment, even sunglasses...." The detachment's enlisted men were quartered in the barracks wing of today's Bldg 1555. Officers were housed in the BOQ, known today as Murphy Hall. In spite of the new construction, however, hangar

space was still in demand. By 1944, the detachment also used a stateside base at Watertown, South Dakota, to winterize aircraft and install test equipment before flying its planes to Ladd.

When the war ended, cold weather testing continued at Ladd on a reduced level. During the first winter after the war, pilots and personnel were demobilized in large numbers. At one point, the commander of the CWTD discovered he had only four experienced pilots left who were familiar with the route between Watertown and Ladd. He set them to work for two months straight, checking out new crews.<sup>45</sup>

<sup>43</sup> Personal communication, Randy Acord.

<sup>44</sup> According to a 1944 plot plan, the Butler buildings were used for the following CWTD functions: transportation; supply; cletrac; equipment section; radio; photo, prop and hydraulic; Wright Field office; a Cold Weather Test office; and armament section. The extant Butler buildings are 1533, 1534, 1537, 1538, 1539, and 1540. They are presently leased to the Bureau of Land Management.

<sup>45</sup> Interview, Randy Acord, 17 May 2002.

Even with reduced personnel, field testing went forward in the immediate post-war years. John Child, a radio operator with the 621<sup>st</sup> AF Base Unit detachment from Eglin Field, recalled being assigned to cold weather testing during the winter of 1946-47. The unit tested B-29, C-54, and P-80 aircraft. On one assignment, they simulated a crash landing at Blair Lakes, practicing ditching procedures and spending several days at the site, testing survival equipment such as emergency and mess kits, clothing and sleeping bags.<sup>46</sup>

By the end of the 1940s, however, Ladd had become a center for strategic reconnaissance and air defense. Cold weather testing continued, but was secondary to the new Cold War missions. One of the ironic handicaps of Ladd's original cold weather testing program was its very reliance on natural cold weather. Extended periods of significant subzero cold could not be scheduled on demand with Mother Nature. In 1947, the Air Force opened a new all-weather test hangar at Eglin AFB in Florida. From then on, Eglin AFB took the lead in the cold weather program. Most of the cold weather aircraft testing took place there, and Ladd played a smaller role in the testing process. However, the need for field evaluation never disappeared entirely, so a Cold Weather Materiel Testing Squadron at Ladd continued to perform field tests on engines, armament and maintenance procedures during this period. USAF's Arctic Aeromedical Laboratory, organized in 1947, also studied medical and psychological aspects of cold weather performance at Ladd during the Cold War period.

In the end, from a logistical and economic perspective, Ladd could not compete with the climactic hangar at Eglin. But Ladd's cold weather testing unit served an important function by providing some of the first hands-on Arctic operational testing and experience. As its commander Dale Gaffney once stated, neither military nor civilian organizations had initially comprehended the true difficulty of undertaking Arctic flying operations. They "either could not or would not recognize that there was any problem in connection with arctic or cold weather operations," he wrote. "This attitude varied from passive resistance to marked antagonism." For Gaffney, it was firsthand experience with cold weather operations that made believers out of designers and engineers. "If the... tests had accomplished nothing other than the fact that the(se) individuals... have been impressed with the rugged and exasperating requirements of arctic operations, it is felt that the time and effort has been well spent."<sup>47</sup> Certainly Ladd's cold weather testing had accomplished this and much more by the war's end.

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<sup>46</sup> Personal communication, Mr. John Child, 9 October 2002.

<sup>47</sup> *Report of Cold Weather Test Detachment, Winter of 1942-1943*. U.S. Army Air Corps, Ladd Field, Fairbanks, Alaska, vol I. 7.





## Testing Activities

A review of the technical achievements of the cold weather test program is beyond the scope of this publication, but some of the efforts are included here in layman's terms to illustrate the scope and breadth of this activity.

The detachment's primary goal during the war was to improve the cold weather performance of all aspects of aircraft and armament in the AAF inventory. The detachment sought information on specific aircraft, their components and instruments, general winterization processes, and ground operations and maintenance requirements. An overall winterization directive was prepared in 1942 and each of its recommendations was evaluated in operation. It addressed a wide variety of issues, including engine oils and lubricants, carburetor functions, de-icing equipment, tires, spark plugs, oil immersion heating, battery carts and many other items. Individual aircraft types were also tested for performance, and so were component parts from various manufacturers. Nearly every imaginable aspect of cold weather operation fell under the purview of the test program as it expanded later in the war, although logistical limitations prevented all of these from being addressed in the field.



**Figure 16.** CWT ground equipment test area, east side of Hangar One. Note C-13 battery carts and Herman-Nelson heaters. B-26 in background. Temperature 35 below zero. AAF photo ca. 1944, courtesy Russ Sackett.

Aircraft testing was a particularly complex operation to support. Instead of having a limited number of aircraft types to maintain, which would have been the usual procedure for a combat wing, Cold Weather Test supported 20 or more different models of airplanes simultaneously. Each one required technical support, proper parts, and detailed maintenance logs. The detachment kept track of it all in an engineering office on the ground floor of Hangar One. Test pilot Randy Acord

recalled: "with all those airplanes we had, we had walls of tech orders."



**Figure 17.** P-38 readied for flight. Courtesy Pioneer Air Museum.

A project officer was assigned to each type of aircraft. Ideally, two aircraft of each type were provided for testing. The project officer was the sole pilot on the first one and was also responsible for the research records of the second. If any unusual maintenance was done, or if components failed, that was photo-documented to supplement the written records that were kept in the engineering office. There was enough photographic work to keep M/Sgt. Paul Solka and a large staff of photographers constantly occupied taking pictures and developing prints for the research files. Each one was done

in triplicate. Randy Acord remembered that Solka would joke, “Yea, we gotta have one for the Japs, one for the Germans, and one for file.” At the end of the test season the project officers compiled all of the information into handwritten reports that secretaries in the Cold Weather Test office would type for submission to headquarters.

Milton Ashkins (Brig. Gen, USAF, ret) was one of the original test pilots and was decorated for combat service during the Aleutian campaign. He served as the Chief of the Fighter Section from 1940-1943, with the exception of his Aleutian duty. He recalled that one of the detachment’s contributions was getting hydraulics to work in subzero temperatures. Randy Acord was a test pilot in the Fighter Section from 1943 to 1946, assigned to the P-38. The detachment made an important contribution to the development of the P-38 by solving a technical difficulty with the carburetor that caused spark plug fouling, made the aircraft vulnerable to engine failure in combat, and prevented the P-38 from getting the range it would need to provide planned bomber escort from the Aleutians to Japan. Acord explained,

To get the long distance range out of a fighter, you had to pull your rpm back to a low engine rpm. When you do this to an Allison engine or a Rolls-Royce engine, you don’t get proper vaporization of your fuel. The raw fuel in liquid form would go through and the amount of lead they had in gasoline then to make 100 octane was 5 ½ ccs of lead per gallon. When that fuel would vaporize, it’d leave the lead in the cylinder. The lead then would accumulate in the spark plugs and foul them up. And if you got jumped by the enemy and threw the throttle to put a lot of power on, you’d get detonation, and pretty soon your engine blows up.

I spent about 220 hours of flying time alone in the P-38 eliminating this problem. We knew that this problem existed before, so in that particular airplane, I could read temperatures in 54 different locations.... I could tell you the temperature of the air from the time it entered that airplane until it entered the cylinder. So we had to devise a system so we could get warm mixture, gasoline and air mixture, at the intake valve of those engines. And we did it, after 220 hours of testing we finally figured out ways to do it, and then they immediately put that into production at Lockheed.

We wanted to get an airplane that was suitable to escort bombers on long-range hauls, because when we got ready to go from Attu to Tokyo, we wanted to have an airplane that would function all the way. This was the secret of getting carburetor heat involved in a turbo-supercharger installation so that we could have a temperature control all the way through to the intake valves. As a result of this, we had to completely block off the inter-cooler so we didn’t lose our carburetor heat. This required an extra installation of what we called a little barn door. It was a little electrically-controlled valve that was in the front of the inter-cooler that we could control automatically or we could control it manually. We chose to control it manually in order to save weight, and it worked perfect. As a result of this...a



### Lunchtime Landings

"I'd had the P-38 on skis, retractable skis, for the whole month of March 1944.... I made 165 take-offs and landings on skis. It was only about 45 of them for the actual test, of what we were wanting to test. But then the manufacturer of the skis...wanted us to put some mileage on them, see how they'd hold up. Well, I made 120 landings, sliding 7,000 feet on each landing, and then take off, come around and set her down again. I had to do that during the noon hour, between 12 and 1 o'clock because at Ladd Field that was our lowest traffic time in the area on the field. So they would make me do this during the noon hour. During that one hour, I could make 25 landings! Fantastic. But I just up and circled around, and I retracted them and extended them every time, and come around and set her down. The skis were made out of laminated wood, and the bottom layer was ironwood....And you know after 165 sliding landings with that thing, it was just as pretty as when we started."

-Randy Acord

P-38 with a 310-gallon belly tank on it could have gone from Attu to Tokyo without refueling, if they didn't have to drop a tank.... Kelly Johnson, the chief design engineer at Lockheed, you could almost hear him yell over the phone when we told him that we had perfected this to the point of being able to use on all aircraft.... [When] we told Kelly Johnson about it, he called Hap Arnold right away and it immediately went into production....



**Figure 18.** Emergency rations. AAF photo, CWTD Report 1942-1943.

In December 1942 a test team bivouacked at an existing crash site near Ladd Field to field test the performance of airplane emergency kits. Among other recommendations, the team suggested that downed pilots in winter should heat both their mess kits and their utensils, or else "the food would become cold and the fork would freeze to the teeth."

-RCWTD, vol II, 350

The improvement of Army Air Force cold weather clothing and emergency survival equipment was also part of the cold weather test program. The AAF needed to develop cold weather gear that specifically addressed the needs of aircrews and which could be mass produced and distributed through military procurement channels. It was an enormous undertaking. Adapting the knowledge of Natives, other local residents, explorers and extreme adventurers to the development of cold weather materials and products was part of the challenge. Tests at Ladd Field contributed to this process, although in most cases the supervising laboratories and agencies were located elsewhere. Efforts to improve clothing and personal equipment sparked considerable controversy within these procurement and development agencies, but the stakes were high for the servicemen who had to depend on this gear. This project only addressed this topic briefly.

Well-known explorers contributed their knowledge to the clothing and equipment test

efforts at Ladd Field. One of the most famous at the time was Australian explorer and aviator Sir Hubert Wilkins. With Alaskan pilot Carl Ben Eielson, Wilkins had made the first trans-Arctic fixed-wing flight from Barrow to Norway in 1928. In addition to flying in the high Arctic, Wilkins had also mounted several



**Figure 19.** Explorers and CWTD officers at Ladd, ca. 1942-43. Left to right: Col. Henry Bordelon, Brig. Gen. (then Col.) Dale Gaffney, Sir Hubert Wilkins, Lt. Col. Ashley McKinley, Lt. Col. Bob Williams. In rear, Lt. Col. R.R. Greiner, Lt. Col. Clarence Hodge. Kay Kennedy Aviation collection, 91-098-854, Archives and Manuscripts, Alaska and Polar Regions Department, University of Alaska Fairbanks.

expeditions to Antarctica. Wilkins had built an international reputation during his career, and his achievements were widely reported in the press. Sir Hubert was associated with the Quartermaster Corps as an expert consultant at Ladd, participating in field tests and submitting findings on clothing.

Lt. Col. Ashley C. McKinley was another distinguished polar aviator serving at Ladd, and he made a lasting impact on the development of military aviation. Unlike Wilkins, who was not an American citizen, McKinley was commissioned as an Air Corps officer and assigned directly to the Cold Weather Test Detachment at Ladd as a liaison officer, advising on cold weather issues. McKinley had flown with Commander Richard Byrd on the first flight over the South Pole in 1929, and made aerial photographic surveys on the expedition.

He was instrumental in suggesting the construction of the all-weather hangar at Eglin AFB, which was renamed in his honor in 1971. McKinley also served as the commander of the CWTD's stateside base in Watertown, South Dakota, and eventually transferred to Eglin. Randy Acord remembered that McKinley lived in a house predating the construction of Ladd Field on what is now Applegate Road. No historic buildings remain in that area today.

Prominent mountaineers also contributed to the clothing and personal equipment programs. Mountaineer and artist Belmore Browne, who took part in some of the earliest attempts to climb Denali (Mt. McKinley), served as a Wright Field clothing consultant and was on the roster of test personnel at Ladd during the 1942-43 test season. Mountaineer and geographer Bradford Washburn was also a civilian advisor to the AAF. Among other things, Washburn participated in the U.S. Army Alaskan Test Expedition on the upper slopes of Denali during the summer of 1942. Ladd Field supported this expedition with aerial supply drops and with radio communication to the mountain team, allowing for rapid reporting back to the research agencies.<sup>48</sup>



**Figure 20.** Parka test. AAF photo.

It was not only well-known explorers but also experienced Alaskans who assisted the Air Corps in its early adaptation to interior Alaskan operations. The Air Corps had developed a contact list of local veterans with previous military flying experience, who presumably provided some assistance. Local pilots and mechanics also shared strategies for dealing with cold weather operations. Medical officers interviewed Native and non-native residents to get help in

<sup>48</sup> Michael P. Sfraga, "Distant Vistas: Bradford Washburn, Expeditionary Science and Landscape 1930-1960," Ph.D. Diss, University of Alaska Fairbanks, 1997, 196-204. Dr. Sfraga also describes Washburn's contribution to the wartime development of AAF clothing in greater depth.

preventing cold injuries. Men from Ladd Field and the research agencies also consulted with Native Alaskans about winter clothing. Some of the military advisors were strong advocates of Native-style gear. However, it soon became clear that it would be nearly impossible to adapt those natural materials to the mass production needs of the military.

The CWTD's parachute shop, staffed mostly by local civilian women, also played a role in the development and adaptation of clothing and gear. When called upon, these women successfully undertook industrial sewing projects to custom-produce items the detachment required. Irene Noyes worked there and remembered they had special assignments in addition to their ordinary duties of packing parachutes, adjusting harnesses, tailoring officers' uniforms, and sewing on insignia. One of their tasks was to make custom wing covers for aircraft. A crew member, a former tentmaker, gave them the initial training to make the covers and they prepared them on site. Irene remembered,

We made them right there, with 12-ounce duck. A B-26 is a big airplane and so is a B-17, it's big. And the duck was heavy and I'd sit at the machine, and there'd be a GI on each side of me, with 50 yards of that 12-ounce duck. They would hold it up so I could lead it through the machine, because I couldn't push it; it was too heavy. Neither could the other girls, and they were bigger than me.

The women in the shop also did custom sewing on the early cold weather test parkas. They made practical adjustments to the Air Corps-issued clothing, adding elastic around the waist and fur around the hood, as Irene put it, "all kinds of good stuff." She recalled that the parkas "were lined with pile and they weren't very warm. Hood, but no fur around it. Forty below, you need a little fur around there. And so we'd have to get fur and sew the fur around the hood. When the first ones came, they didn't have a [cuff]; you have an open sleeve at forty below your arm gets cold." She added, "There was a lotta things they didn't have on there that we put on, and we got pretty good at making the cold weather test parkas. The guys liked it. I even sewed the cold weather test flag that they did for [a] parade.... They had us do everything, you know."

The full history of Ladd Field's contribution to cold weather testing is still unwritten and lies beyond the scope of this project. More information about the "cold nose kids," their battles with the cold weather gremlins, and the contributions of knowledgeable Alaskans will add to our understanding of the role Ladd Field played during World War II.

